

WHAT IS CLAIMED IS:

1. A control unit for a motor-assisted vehicle including a manual powered drive system for transmitting a manual drive force to a rear wheel and a motor drive system for transmitting a motor drive force by a motor to said rear wheel, said control unit comprising:

means for detecting an actual running resistance of a vehicle; and

means for controlling and generating an assist drive force corresponding to the actual running resistance of said motor drive system.

2. The control unit for a motor-assisted vehicle according to claim 1, wherein said means for controlling and generating increases the drive force generated by said motor drive system at a start of a pedaling operation of said vehicle.

3. The control unit for a motor-assisted vehicle according to claim 2, further including means for detecting a speed of said vehicle, wherein a state indicative of the start of the pedaling operation is identified when the vehicle speed is in a predetermined vehicle speed range.

4. A control unit for a motor-assisted vehicle including a manual powered drive system for transmitting a manual drive force to a rear wheel and a motor drive system for transmitting a motor drive force by a motor to said rear wheel, said control unit comprising:

means for detecting an actual running resistance of a vehicle;

means for generating an assist drive force corresponding to the actual running resistance; and

means for calculating and detecting an acceleration of said vehicle; wherein said means for generating the assist drive power increases the assist drive force generated by said motor drive system in accordance with the acceleration after a predetermined value of time.

5. The control unit for a motor-assisted vehicle according to claim 1, further including:

means for setting a predetermined running resistance of an ordinary bicycle;

means for determining the assist drive force generated by said motor drive system in accordance with a difference between the actual running resistance and the ordinary bicycle's running resistance; and

means for determining an inclination of a road surface on the basis of the actual running resistance; wherein the drive force is increased when the road surface is a flat road or an upward slope; and the increasing operation of the drive force is performed by reducing the ordinary bicycle's running resistance.

6. The control unit for a motor-assisted vehicle according to claim 4, further including:

means for setting a predetermined running resistance of an ordinary bicycle;

means for determining the assist drive force generated by said motor drive system in accordance with a difference between the actual running resistance and the ordinary bicycle's running resistance; and

means for determining an inclination of a road surface on the basis of the actual running resistance; wherein the drive force is increased when the road surface is a flat road or an upward slope; and the increasing operation of the drive force is performed by reducing the ordinary bicycle's running resistance.

7. The control unit for a motor-assisted vehicle according to claim 1, further including:

means for detecting a vehicle speed change amount for a predetermined period of time; and

means for detecting a total drive force obtained by adding the assist drive force of said motor to the manual drive force for the predetermined period of time; wherein the actual running resistance is calculated as a function of the vehicle speed change amount to the total drive force.

8. The control unit for a motor-assisted vehicle according to claim 2, further including:

means for detecting a vehicle speed change amount for a predetermined period of time; and

means for detecting a total drive force obtained by adding the assist drive force of said motor to the manual drive force for the predetermined period of time; wherein the actual running resistance is calculated as a function of the vehicle speed change amount to the total drive force.

9. The control unit for a motor-assisted vehicle according to claim 1, wherein the assist drive force generated by said motor drive system is controlled in such a

manner that the actual running resistance of said vehicle substantially corresponds to a flat road running resistance of said vehicle.

10. The control unit for a motor-assisted vehicle according to claim 6, wherein the assist drive force generated by said motor drive system is controlled in such a manner that the actual running resistance of said vehicle substantially corresponds to a flat road running resistance of said vehicle.

11. The control unit for a motor-assisted vehicle according to claim 4, wherein the flat road running resistance is set to a flat road running resistance of an ordinary bicycle.

12. The control unit for a motor-assisted vehicle according to claim 5, wherein the assist drive force generated by said motor drive system is decreased for a predetermined period of time if the inclination of the running road surface is changed into an upward inclination, and the drive force generated by said motor drive system is increased for a predetermined period of time if the inclination of the running road surface is changed into a downward inclination.

13. The control unit for a motor-assisted vehicle according to claim 12, wherein said means for determining the road surface inclination compares a ratio of the actual running resistance to a predetermined flat road running resistance, and if said ratio is larger than the predetermined value, the running road surface is determined to be an upward slope and if said ratio is smaller than the predetermined value, the running road surface is determined to be a downward slope.

14. A control unit for a motor-assisted vehicle including a manual powered drive system for transmitting a manual drive force to a rear wheel and a motor drive system for transmitting a motor drive force by a motor to said rear wheel, said control unit comprising:

means for detecting an actual running resistance of a vehicle; and

means for controlling and generating an assist drive force corresponding to the actual running resistance of said motor drive system; and

means for deciding an operational state of said vehicle.

15. The control unit for a motor-assisted vehicle according to claim 14, further comprising means for controlling a regeneration instruction, wherein a regeneration instruction is supplied to said motor drive system in accordance with the operational state of said vehicle when the actual running resistance is a negative value.

16. The control unit for a motor-assisted vehicle according to claim 15, further including means for detecting a speed of said vehicle; wherein said regeneration control means supplies the regeneration instruction in such a manner that a regeneration output is changed in accordance with the vehicle speed.

17. The control unit for a motor-assisted vehicle according to claim 15, wherein said regeneration control means supplies the regeneration instruction in such

a manner that a change amount of the regeneration output is gradually increased in accordance with the vehicle speed in a predetermined high vehicle speed range.

18. The control unit for a motor-assisted vehicle according to claim 16, further comprising means for detecting a braking operation; wherein said regeneration control means supplies the regeneration instruction in such a manner that the regeneration output is increased in response to a signal indicating detection of the braking operation.

19. The control unit for a motor-assisted vehicle according to claim 16, wherein said regeneration control means prohibits the supply of the regeneration instruction in a predetermined low vehicle speed range equivalent to a vehicle speed at the time when a driver walks said vehicle.

20. The control unit for a motor-assisted vehicle according to claim 14, further comprising:

means for detecting an actual running resistance of a vehicle;

means for generating a first assist drive force corresponding to the actual running resistance;

means for generating a second assist drive force for said motor drive system corresponding to a leg-driven manual power and a crank shaft rotational speed; and

control means for generating said first drive force and said second drive force selectively or in combination in accordance with the operational state.

21. The control unit for a motor-assisted vehicle according to claim 14,
further comprising:

means for detecting an actual running resistance of a vehicle;

means for generating a first assist drive force corresponding to the actual
running resistance;

means for generating a second assist drive force for said motor drive system
corresponding to a leg-driven manual power and a crank shaft rotational speed; and

means for deciding an inclination state of a road surface on the basis of the
actual running resistance; wherein either the first drive force and the second drive
force, or only the second drive force are selectively generated if it is decided that the
road surface is a flat road on the basis of the inclination state.

22. The control unit for a motor-assisted vehicle according to claim 14,
wherein said control means is configured to selectively generate either the first drive
force and the second drive force, or only the second drive force, if it is determined by
said means for deciding operational state decides that the vehicle is in a state of initial
pedaling startup.